



Overview

Colombia has seen a dramatic increase in oil, natural gas, and coal production in recent years after the implementation of a series of regulatory reforms.

The enactment of a series of regulatory reforms to make the oil and natural gas sector more attractive to foreign investors led to an increase in Colombia production. The government implemented a partial privatization of state oil company Ecopetrol (formerly known as Empresa Colombiana de Petróleos S.A.) in an attempt to revive its upstream oil industry. However, after nearly a half-decade of relatively secure operations, attacks on oil and natural gas pipelines have increased. Expanded oil production will require discoveries of reserves and improvements to infrastructure safety.

In 2011, the U.S. Energy Information Administration (EIA) estimates that Colombia consumed 1.48 quadrillion British thermal units (Btus) of total energy. Oil constituted the largest part of this amount, followed by hydroelectricity, natural gas, and coal. The country relies on hydropower for the bulk of its electricity needs and uses very little coal domestically. Of the 94.6 million short tons (MMst) of coal produced, Colombia exported 94% in 2011. Natural gas consumption in Colombia has grown, rising over 54% in the past decade.



Source: Central Intelligence Agency, *The World Factbook*

Oil

Colombia's oil production has increased since 2008 because of increased exploration and development. New exploration and development were spurred by regulatory reform.

According to the *Oil and Gas Journal* (OGJ), Colombia had approximately 2.4 billion barrels of proven crude oil reserves as of January 1, 2014. Although exploration continues and discoveries are announced, Colombian officials estimate that, at current reserve levels, the current oil reserves would last about seven years.

Much of Colombia's crude oil production occurs in the Andes foothills and the eastern Amazonian jungles. Meta department, in central Colombia, is also an important production area, predominately of heavy crude oil. Its Llanos basin contains the Rubiales oilfield, the largest producing oil field in the country.

Sector organization

Ecopetrol, the national oil company of Colombia, formerly controlled the development of all hydrocarbon resources. However, Colombia decided reforms were needed in the face of declining reserves and production, and in 2003, President Uribe enacted energy sector reforms. President Uribe moved the administrative and regulatory functions of hydrocarbon resources from Ecopetrol into the regulatory body ANH, regulating all upstream activities. The Ministry of Mines and Energy administers the overall policy and planning coordination, and it also regulates the downstream sector.

Colombia's government has taken measures to make the investment climate more attractive to foreign oil companies. Upstream sector initiatives give foreign oil companies the right to own 100% stakes in oil ventures and compete with Ecopetrol. In addition, the government has sold shares of Ecopetrol to private investors, reducing its share to roughly 90%. These reforms have sparked a renewed interest in Colombia's upstream sector, with record levels of exploratory and development drilling underway. According to the Colombian central bank, the oil sector received \$5.39 billion in foreign direct investment (FDI) in 2012, accounting for 34% of total FDI in Colombia.

In December 2012, ANH concluded a bid round of 115 blocks. About 30% of these blocks are believed to contain shale or coalbed methane gas. To attract investments to these blocks, the government decreed a 40% discount on royalties from them. The auction also included 13 mostly deepwater offshore blocks containing both crude oil and natural gas. A total of 27 companies were awarded blocks, although many companies shied away from the shale, coalbed, and deepwater blocks.

Exploration, production, and consumption

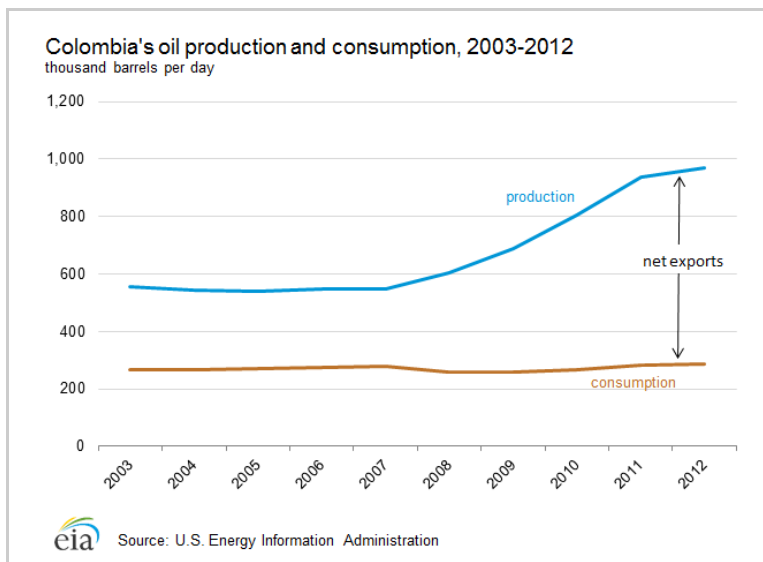
EIA forecasts that Colombian oil production will rise to over 1 million bbl/d in 2013 and will continue rise up to 2015.

Colombia produced 969,000 barrels per day (bbl/d) of oil in 2012, up 61% from the 604,000 bbl/d produced in 2008. EIA estimates that oil production in 2013 to be just over 1 million bbl/d and expects this rising trend to continue. The Ministry of Mines and Energy reported that Colombian production is expected to reach 1.3 million bbl/d by 2020. Colombia consumed 287,000 bbl/d in 2012, allowing the country to export most of its oil production.

Prior to 2008, Colombia's oil production had been largely flat for many years, following a period of steady decline that started in 1999, when Colombia's oil production peaked at 830,000 bbl/d. The principal cause of the fall in oil production was natural declines at existing oil fields and a lack of new reserve discoveries. However, a combination of changes to the regulatory framework has contributed to increasing investment in the country by international oil companies.

As a result of these improvements, in 2008, Colombia reversed the decline in its oil production that began in 1999 and is now experiencing rapid growth. EIA forecasts that Colombia's oil production will increase in the next two years: in the November 2013 edition of the [Short-Term Energy Outlook](#), EIA projected that Colombian oil production will rise to over 1 million bbl/d in 2014.

The largest producing oil field in the country is the Rubiales heavy oil field, located in Meta department, and operated by partners Pacific Rubiales and Ecopetrol. Low levels of production began at Rubiales in the late 1980s, but increasing investment and the completion of a new pipeline have allowed production rates to rise in recent years. Gross production at Rubiales exceeded 177,000 bbl/d in 2012, up from 37,000 bbl/d in 2008. Other large oil fields include Cano Limon, Castilla, and Cupiagua.



Oil exports

The United States is the top destination for Colombia's oil exports.

In 2012, the United States was Colombia's top oil export destination, followed by Panama, [China](#), and Spain. In that year, Colombia exported 432,000 bbl/d of crude oil and refined products to the United States. China expressed interest in financing new infrastructure projects in Colombia to facilitate the transport of oil to the Pacific coast for export. In May 2012, preliminary agreements were made for China Development Bank to finance a 600,000 bbl/d pipeline to transport Colombian and Venezuelan oil to the south Colombian Pacific coast. However, no significant developments have been made since then.

Pipelines

Colombia has six major oil pipelines, four of which connect production fields to the Caribbean export terminal at Covenas. These include the 500-mile Ocsa pipeline, which has the capacity to transport 650,000 bbl/d from the Cusiana/Cupiagua area; the 460-mile, 220,000 bbl/d-capacity Cano Limon pipeline; and the smaller Alto Magdalena and Colombia Oil pipelines. The Llanos Orientales pipeline came online in late 2009, linking the Rubiales field to the Ocsa pipeline, with a capacity of 340,000 bbl/d. The sixth pipeline, the TransAndino, has a capacity of 190,000 bbl/d and transports crude from Colombia's Orito field in the Putumayo basin to Colombia's Pacific port at Tumaco linking to [Ecuador](#).

In November 2010, Ecopetrol announced that it is partnering with an international consortium to develop the Oleoducto Bicentenario pipeline. This \$4.2 billion project, currently under construction, will have a peak capacity of 450,000 bbl/d. The first phase (110,000 bbl/d) began operations in October 2013 transporting hydrocarbons from Arguaney to Banadia, where it connects to the Cano Limon pipeline. The Oleoducto Bicentenario will eventually connect to the export terminal in Covenas.

Pipelines and other energy infrastructure in the country are still the targets of attacks by anti-government guerrillas. Pipeline attacks significantly declined from 155 in 2005 to 31 in 2010. However, beginning in 2011 there were 84 pipeline attacks and have been continually increasing since then, according to Colombia's Ministry of Defense. Between January and

September of 2013, there were 147 attacks. This rise in the number of attacks has led to significant increases in unplanned production disruptions in Colombia. EIA estimates Colombia averaged 35,000 bbl/d of unplanned production disruption so far in 2013, more than a 115% increase from 2012. The increasing attacks on infrastructure are closely linked to the appointment of a new leader of the anti-government Revolutionary Armed Forces of Colombia-People's Army (FARC).

Downstream

According to OGI, Colombia had 290,850 bbl/d of crude oil refining capacity in 2012 at five refineries, owned by Ecopetrol. The 205,000 bbl/d Barrancabermeja-Santander facility and the 80,000 bbl/d Cartagena refinery possess most of the country's crude distillation capacity. Ecopetrol assumed complete ownership of the Cartagena plant after purchasing the stake formerly held by Glencore. Although Colombia is a net oil exporter, it must import some refined products, especially diesel fuel, as domestic demand outstrips refining capacity. As a result, Ecopetrol has begun efforts to expand refining capacity in the country. The \$6.47-billion expansion of the Cartagena refinery, scheduled to be completed in 2015, will more than double its current capacity to 165,000 bbl/d. Ecopetrol is also expanding the Barrancabermeja plant, which will increase its capacity to 300,000 bbl/d and improve the refinery's ability to process heavier crude oils. The expansion, currently under construction, is expected to be completed in 2016.

Natural gas

Colombia is self-sufficient in natural gas supply and recently began exporting to neighboring Venezuela.

According to the ANH, Colombia had proven natural gas reserves of more than 5.7 trillion cubic feet (Tcf) as of December 31, 2012. The bulk of Colombia's natural gas reserves are located in the Llanos basin, although the Guajira basin accounts for the majority of current production. Natural gas production, like oil production, has risen substantially in the past few years, because of increasing international investment in exploration and development. The country has also encountered rising domestic consumption and new export opportunities.

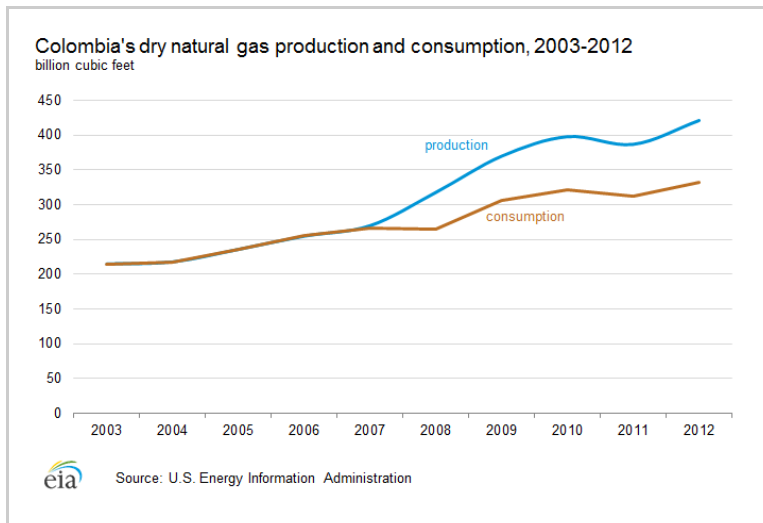
Exploration and production

Colombia produced 387 billion cubic feet (Bcf) of dry natural gas in 2011 and consumed 312 Bcf. Of the country's total gross natural gas production of 1,115 Bcf, about 56% was reinjected to aid in enhanced oil recovery. In 2007, natural gas production began to exceed consumption, allowing for exports.

Chevron is the largest natural gas producer in the country, producing more than 600 million cubic feet per day (Mcf/d) of gross natural gas. In partnership with Ecopetrol, the company operates the Caribbean Chuchupa offshore field in the Guajira basin, the largest non-associated natural gas field in the country. The company also operates the nearby onshore Ballena and Riohacha fields. The two biggest natural gas fields in the country, the Cupiaga and Cusiana fields in the Llanos basin in central Colombia, were acquired from BP by Ecopetrol and Talisman Energy in 2010. Almost all of the gas produced from these fields is

reinjected.

The Colombian government published a decree in March 2011 outlining a plan to increase domestic natural gas production, including production from shale or coalbed methane gas fields. Policies aimed at increasing domestic natural gas consumption and exports, combined with increased demand from the power sector as a result of weather-related hydroelectric shortages, have made expanding natural gas production a priority for the government.



Pipelines

There are about 2,000 miles of natural gas pipelines in Colombia. Empresa Colombiana de Gas (Ecogás) operates most of Colombia's natural gas pipeline network. Colombia has three main lines: the Ballena-Barrancabermeja, linking Chevron's Ballena field on the northeast coast to Barrancabermeja in central Colombia; the Barrancabermeja-Nevia-Bogota line, which connects the Colombian capital to the transmission network; and the Mariquita-Cali line through the western Andean foothills.

Export pipeline

In early 2008, the Trans-Caribbean Gas Pipeline, also known as the Antonio Ricaurte pipeline, came online, linking the Ballena field in northeastern Colombia with western [Venezuela](#). Venezuela's Petróleos de Venezuela S.A. (PdVSA) financed the \$467-million pipeline. In November 2011, the countries signed an agreement to extend the Ricaurte pipeline across Colombia to Panama and [Ecuador](#). Although initial contracted volumes for export from Colombia ranged from 80-150 million cubic feet per day (MMcf/d), actual exports to Venezuela have often exceeded these levels because of rising Venezuelan demand for natural gas for power generation and reinjection. While PdVSA has been developing its domestic natural gas resources, it will likely renew its supply contract of 200 MMcf/d from Colombia in June 2014.

Coalbed methane

Coalbed methane (CBM) is a gaseous hydrocarbon that occurs along with coal reserves. This source of natural gas is transported and used in the same way as gas found in shale or other deposits. Drummond, a U.S. coal company with interests in Colombia, has stated that its Colombian mines could contain up to 2.2 Tcf of CBM. The company has signed

contracts with Ecopetrol to extract CBM from both the La Loma and El Descanso mines. CBM has the potential to increase Colombia's proven natural gas reserves dramatically, facilitate greater domestic production, and allow additional natural gas exports to neighboring countries.

Coal

Colombia was the fifth-largest coal exporter in the world in 2011.

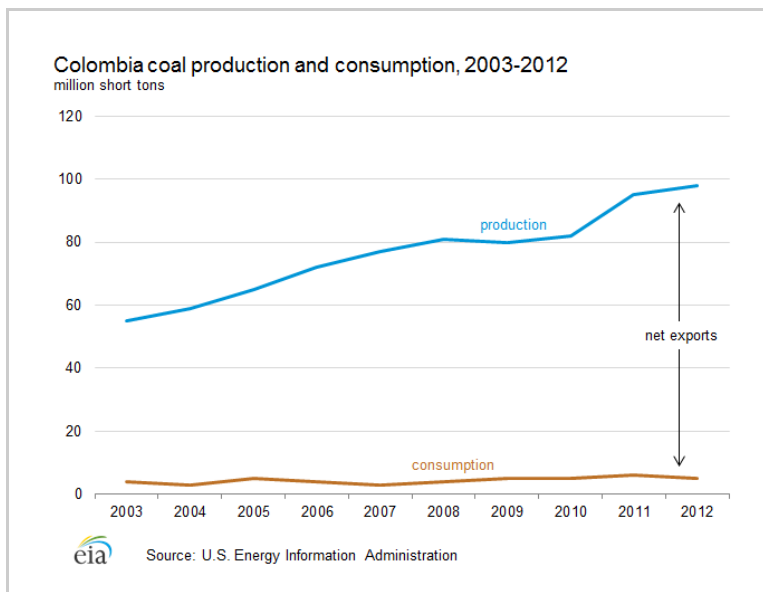
Colombia had 5,557 million short tons (MMst) of probable coal reserves, mostly bituminous, in 2012, the largest in South America according to the Latin American Energy Organization. These deposits are concentrated in the Guajira peninsula bordering the [Caribbean](#) and in the Andean foothills. The majority of Colombia's coal production and export infrastructure is located on the Caribbean coast. Colombia's coal is relatively clean-burning, with a sulfur content of less than 1%. The country exports most of its coal production. In 2011 it was the fifth-largest coal exporter in the world after [Indonesia](#), [Australia](#), [Russia](#), and the United States.

Production

Colombia produced 98.1 MMst of coal in 2012, while only consuming 5.1 MMst. Colombian coal production is exclusively carried out by private companies and has increased about 78% in the past decade.

The largest coal producer in Colombia is the Carbones del Cerrejon consortium, composed of Anglo-American, BHP Billiton, and Xstrata. The consortium operates the Cerrejon Zona Norte (CZN) project, the largest coal mine in Latin America and among the largest open-pit coal mines in the world. CZN is an integrated system of mine, railroad, and a Caribbean coast export terminal.

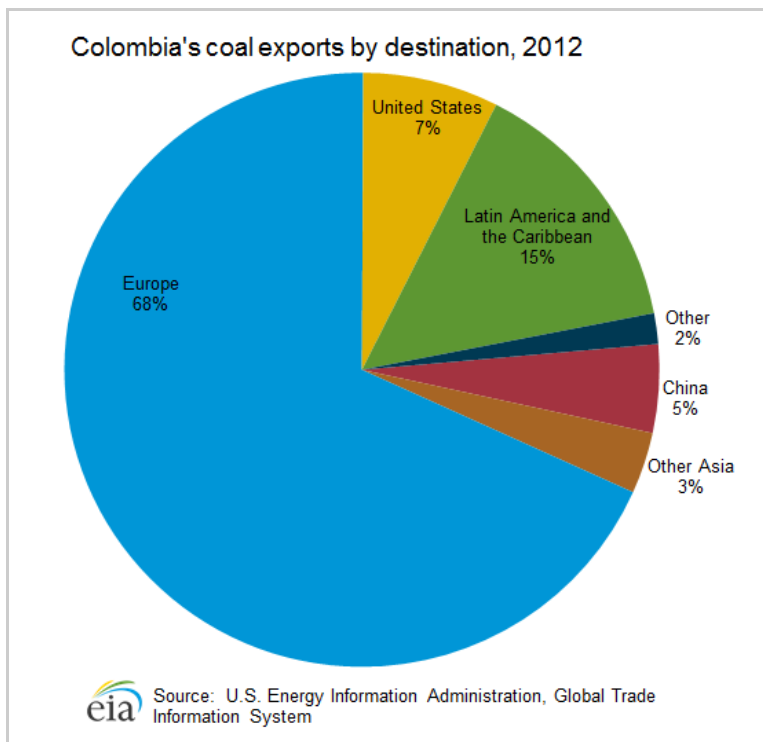
U.S.-based Drummond Company operates, La Loma, the second-largest coal mining operation in Colombia, which is also an integrated mine-railway-port project. In June 2011, Drummond entered into an 80%-20% partnership with Japan's Itochu Corporation, known as Drummond International, which now owns and operates its Colombia interests. Itochu's initial investment of \$1.5 billion will enable expansion of the project with the construction of a new export facility and will increase export capacity to 40-45 MMst per year. The partnership is aims to increase coal exports to [Japan](#) and other Asian countries.



Exports

Preliminary customs data shows that Colombia exported 83 MMst in 2012, mainly to Europe, other South American countries, and the United States. Coal exports are an important part of the Colombian economy. Coal was the country's second-largest export after oil and petroleum products and represented 19% of export earnings in 2012. The United States and Colombia have a major trading relationship in this sector, and in 2012, Colombian coal represented 76% of U.S. coal imports, or 3.3 MMst.

Colombia recently began exporting sizable quantities of coal to Asian markets, especially China. According to Global Trade Information Services, Asia's share of Colombian coal exports grew from less than 1% in 2008 to 8% in 2012. A combination of higher prices in Asia, lower freight costs, and falling exports to the United States spurred this expansion into Asian markets. In May 2012, talks were held in Beijing between the presidents of China and Colombia regarding China's interest in investing in Colombia's coal sector and in the construction of a railroad to the Pacific coast to facilitate exports to Asia. Both the expansion of the Panama Canal (currently slated for completion by 2015) and Chinese-backed transportation infrastructure projects could generate greater exports of Colombian coal to Asia in the future.



Electricity

In October 2013, Colombia had 14.4 gigawatts (GW) of installed electricity generation capacity, over 60% derived from hydropower according to the Unidad de Planeación Minero Energética (UPME), the federal special administrative unit responsible for the sustainable development of the mining and energy sectors of Colombia.

In October 2013, Colombia generated 5.3 terawatt hours (TWh) of electricity. Of electricity generated, hydroelectric plants provided 68%, gas accounted for 18%, coal accounted for 8%, oil accounted for less than 1%, and the remaining percentage was from other sources.

Exports

Colombia is a net exporter of electricity. According to the UPME, Colombia exported a total of 57.8 gigawatt hours (GWh) of electricity, of a total 57.9 GWh traded in October 2013. Of total exports, 89% is exported to Venezuela and the remainder to Ecuador. Colombia imported just 0.1 GWh from Ecuador.

Notes

- Data presented in the text are the most recent available as of January 7, 2014.
- Data are EIA estimates unless otherwise noted.

Sources

- Bicentenario
- BP
- Central Intelligence Agency

- Chevron
- Colombia Ministry of Defense
- Colombia Ministry of Mines and Energy
- Colombia Reports
- Comisión de Regulación de Energía y Gas
- Dow Jones
- Drummond Co.
- EcoPetrol
- Global Refining and Fuels Report
- Global Trade Information System
- National Hydrocarbons Agency
- Occidental
- Oil and Gas Journal
- OpenOil
- PFC Energy
- Platts
- Repsol
- Reuters
- Tendersinfo
- Unidad de Planeación Minero Energética
- U.S. Energy Information Administration